A critical appraisal of "Effect of Lumbar Stabilization and Dynamic Lumbar Strengthening Exercises in Patients With Chronic Low Back Pain"

By

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Abstract

This critical appraisal addresses the article "Effect of Lumbar Stabilization and Dynamic Lumbar Strengthening Exercises in Patients with Chronic Low Back Pain" and its ability to answer clinical questions related to physical therapy. As low back pain injuries are one of the widely prevalent impairments that physical therapist address today, it is abundantly necessary to conduct research, as well as appraisals of previous research, on the common intervention methods (i.e Lumbar Stabilization & Dynamic Lumbar Strengthening) being used and their benefits and/or lack thereof. This appraisal provides a reasoning for the selection of the article as well as addresses the methods used in the search for it. One by one, the Introduction, Methods, Results, and Discussion sections of the article are all assessed thoroughly for their respective strengths and limitations. Within each of these sections the overall quality of the research is discussed as well as possible corrections for any limitations that were found. The findings of this study are then discussed and appraised for their clinical significance and potential global application to the field of physical therapy.

Key words

Stabilization

Core Strengthening

Dynamic

Low back pain

Introduction

Low back pain (LBP) is an impairment rampant in the entire world and impacts the field of physical therapy dramatically. According to this study, LBP affects 50% of the general population and approximately 70% of adults have reported at least one episode of low back pain. Both lumbar stabilization and dynamic core strengthening exercise programs have been used to combat these injuries. However, very little research outside this study has been conducted to determine which exercise program is more appropriate. Therefore, this article is a prime subject for critical appraisal to assess its findings and understand their global clinical significance within the field. This critical appraisal answers the clinical question: Do lumbar stabilization exercises elicit strength and range of motion improvements faster than traditional dynamic core strengthening exercises in young athletes looking to improve performance after low back injuries?

Methods

The databases used to locate appraisal worthy articles were PubMed and PEDro (Physiotherapy Evidence database). These two databases were selected because they are both well respected and highly regarded databases that provide an efficient way to gain information about Physical Therapy interventions. Keywords used in the searching process were as follows: Stabilization, Core, Strengthening, Athletes, and Low Back Pain. The article search was limited to full text research based articles in English from a reliable search database that appropriately related to the aforementioned clinical question. Full text articles in English ensured the article could be read

and studied to determine if they held up to the type and quality of research necessary for appraisal. PEDro allowed for the obtaining of true "experimental studies" (as opposed to reviews) of the interventions in focus. The search had an inclusion of young individuals with LBP to match the patient population with that of the clinical question. Meanwhile the search excluded any studies that failed to focus specifically on comparisons between Lumbar Stabilization & Dynamic Core Strengthening Exercises intervention to assess which of the two interventions performed better on the same patient population. A total of 34 and 38 results from PEDro & PubMed respectively were found before the initial reviewing and excluding of the articles was conducted.

The article was selected from the Annals of Rehabilitation Medicine Journal and was written/conducted by Hye Jin Moon, MD, Kyoung Hyo Choi, MD, Dae Ha Kim, MD, Ha Jeong Kim, MD, Young Ki Cho, Kwang Hee Lee, Jung Hoo Kim, Yoo Jung Choi, a group of authors within the Department of Rehabilitation Medicine at the University of Ulsan College of Medicine, in Seoul, Korea. This study was conducted in an outpatient clinic in Seoul, Korea in 2012 and was published in 2013. Their article was selected for appraisal due to the specific nature of its focus on the comparison between the effects of Lumbar Stabilization & Dynamic Core Strengthening in population of individuals with chronic low back pain and the potential relevance their results could have on future therapy interventions.

Results

Summary of the study

This study focused on comparing the effects of dynamic core strengthening and lumbar stabilization on isometric strength and patient discomfort. The study was double blinded with the patients being randomized into two groups receiving the two different exercise programs, and the evaluator of the subjects being blinded to the individual's group assignments. A physical therapist (not involved with the evaluation) trained with extensive knowledge in low back pain observed and conducted the proper 8-week training program for the two different groups. Members of each group were evaluated for strength at various angles from zero to seventy-two degrees, testing every 12 degrees, using a MedX lumbar extension machine with ten second rest intervals being given after each assessment. Upon completion of strength testing, the members of both groups were asked to rate their function after the respective programs using a VAS and ODQ questionnaires. Results showed that both groups increased in isometric strength and aided in functional increase/pain relief. However, the individuals that underwent the stabilization program reported higher amounts of strength and functional pain relief than the group that only performed strength exercises.

Appraisal of the study introduction

Overall, the introduction is comprehensive and provides a solid background on chronic low back pain and its prevalence in today's society. The authors discussed how certain common rehabilitation exercise programs are not eliciting satisfactory results. They also explained the

muscle groups that will be assessed through lumbar stabilization during the study which is good for individuals who do not have a strong background in these programs.

However, the introduction lacked a clear explanation as to why dynamic core strengthening was chosen to be compared to lumbar stabilization. Sources were cited stating that lumbar stabilization has been useful in alleviating low back pain pointing to why it was chosen for study, but no such information was provided for dynamic core strengthening. It referenced that several exercise regiments have been used unsuccessfully to rehabilitate low back pain but did not provide a true reasoning as to why dynamic core strengthening was the exercise program selection for comparison.

Appraisal of the study methods

One of the strengths of this article was the detailed methods section. The study was conducted in a double-blind format where both the subjects and examiner of the outcome measures where blinded of group assignments. Exercise methods sections stated the number of exercises performed, duration of contraction, the cues given by the therapist, and even provided pictures of both programs that were referenced in the section. This study could be easily replicated by other individuals if they were to want to do so. Also each of the outcome measurement tools (i.e. MedX, Visual Analog Scale (VAS), and Oswestry Disability Questionnaire (ODQ)) are reliable and backed by references to literature from two well respected journals (i.e. The Physical Therapy and Rehabilitation Journal and the Spine Journal).

However, only 21 of 24 recruited subjects completed the study due to attrition of two dynamic core strengthening and one lumbar stabilization participants. The article states the participants dropped out of the study due to "personal reasons". The attrition and lack of clear rationale for it is concerning as the result from the individuals in both groups could have skewed the data in both groups in either a positive or negative direction depending on the bias of those conducting the study. There is no clear statement other than the fact that they were recruited from the same outpatient clinic, was made on the sociodemographic, clinical, and or prognostic characteristics of the two groups in this study which presents a concern as different populations, environments, and prognostic factors can affect the figures from the groups and may sway the overall results.

Appraisal of the study results

The results section of this article was well written, clear, and concise. The authors answered each research question regarding isometric strength, pain severity, and functional disability in that order as well as referring to tables and graphs that helped supplement their descriptions. Each of the outcome measures stated in the methods were displayed within the results section both in writing and/or in a table format.

A major weakness in the results is the misleading nature of figure 3. Without reading the small print at the bottom portion, it may lead one to think that the stabilization group performed much better than the significance of the data supports. Another weakness is that neither the MCID nor the NNT values for the outcome measures used are referenced in this article. This

would have been very helpful in determining if the results obtained in the study were truly clinically significant.

Appraisal of the study discussion

Hye Jin Moon, et al. did well in further explaining and discussing their findings of the results. Sufficient detail was used in explaining the meaning of the MedX and ODQ scores specifically. Nine different sources from well-respected journals (i.e. Physical Therapy Journal, Spine Journal, and the Archive of Physical Medical Rehabilitation) were referenced within the discussion section of this article. The authors also made sure to state a comprehensive list of limitations to their study and not over conclude their results.

A potential weakness might be the fact that a few of the sources used within the discussion were over 20 years old bringing into question their modern time credibility. There is also no formally stated future study that is planned which is questionable given the success of the study.

Discussion

With low back pain being such a common occurrence and little research available on the benefits of specific rehabilitation techniques, studies like this one can help the therapist know which exercise program is more appropriate for their respective patients' goals from rehab. This study can answer the clinical question above through not only comparing the effects of the interested exercise programs but also by focusing on a similar age group. The question in focus was interested on young athletic populations (approximately 25-32) and this study centered around similarly aged individuals (28.4 +/- 5.0).

After reading and appraising this article it seems to be clear that lumbar stabilizing exercise programs are superior over core dynamic strengthening for eliciting initial isometric strength benefits, pain severity, and functional disability. The MedX values between the two programs for angles 0 and 12 had a significant difference with lumbar stabilization producing larger strength gains. Also, both the VAS and ODQ scores before and after exercise were significant in the lumbar stabilization exercise group which was not so in the dynamic core strengthening group. Like all exercise programs, there is a risk of potentially further aggravating the injury with lumbar stabilization exercises. Especially due to the required use of stability balls and chairs that might give way and lead to further injury in this program as opposed to no such equipment being needed to perform a dynamic core strengthening program like the one is this study. It may be suggested that lumbar stabilization programs should be conducted only on populations of patients that can handle the use of the necessary equipment. However, if performed correctly with the proper therapist training and supervision the potential gains in strength far outweigh the risks. More research like the one in the article with a larger variety of

patient populations could help better determine if the benefits that were obtained in this study could be globally applied in the field.

The research conducted in this study was well organized and the outcome measures that were used are well respected and traditionally reliable. The measuring of lumbar extension with a Medx and finding a significant difference between the lumbar stabilization and core dynamic strengthening exercise programs at the angles of 0 and 12 degrees, especially given that the p value at these angles is less than .01 should give a therapist confidence in using this evidence with their future patients. The fact that the VAS and ODQ scores were significantly different before and after the program in the lumbar stabilization program indicates that the patients subjectively feel they are progressing more within that program. A SPT like myself could easily implement this intervention safely and appropriately not only with the skills they have learned throughout PT school but also with the aid of the detailed description and images of the exercise programs provided within the methods section of the article.

Overall Hye Jin Moon, et al's study is a well-organized and reliable study that can be easily reproduced and built upon. This research study opens the door for others like it to occur in the future. Hopefully, future studies will address the limitations in patient population and longer-term benefits from exercise program use. With the information obtained from their findings and other accompanying findings that may be found in future studies, physical therapists should be able to better determine and implement an appropriate exercise program that can improve strength, pain management, functional mobility, and overall quality of life for individuals dealing with low back pain impairments.